



Prioritized Technology: High-Temperature Compatible Power Systems Batteries

Capability Description

Batteries for high temperature applications such as Venus surface missions

1. High temperature capability up to 500 °C
2. Extended mission capability 3000 hrs or more
3. Capable of handling high pressure (90 bar) corrosive environment.
4. For early Venus surface missions, battery will need to operate for a few minutes at a time and provide 7 to 10 Watts of power.

Capability Status

- Molten salt thermal batteries heated to 400 – 550 °C are used in missile applications for short durations.
- A prototype thermal battery designed for the MSL Descent Stage was flight qualified (fabricated by Eagle Picher)¹. Operation design life was 30 minutes.
- Thermal batteries become an ambient temperature solution for Venus.

Mission Applications

- High temperature capable batteries will be enabling for any Venus surface mission with a duration of more than a few hours.
- A primary battery may be sufficient for a mission lasting one Venus solar day (3000 hours).
 - A rechargeable battery that can function as a primary battery would be usable for both near and far term missions.
 - This same battery is adaptable to Jupiter and Europa missions

Development Cost and Schedule